

REMARKS

Claims 1-14 are pending in this application.

Claim 1 has been amended to recite that the charge-transporting substance is composed of a charge-transporting oligomer having a number-average molecular weight of 200 to 2,000. Support for this upper limit value can be found on page 11, line 17.

Claims 7-9 have been amended to be in the method format. Support can be found on page 18 of the specification.

New claims 12-14 find support at page 17, beginning at line 23 of the present specification.

No new matter has been added by way of the above-amendment.

Kosho et al.

Claims 7-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Kosho et al. (JP 2002-151272). Applicants respectfully traverse the rejection.

It is noted that in the paragraph numbered as "6" on page 4 of the Office Action, the Examiner admits that:

Kosho et al. does not disclose the process where the auxiliary layer (hole injection layer) is formed from a composition comprising a solvent with a particular viscosity...

As such, Applicants have amended claims 7-9 to be directed to the process. Also, it is noted that the newly amended process includes all the limitations of the product claim 1.

Since the product formed by the process of claims 7-9 is novel and nonobvious over the teachings of Kosho et al., it naturally follows that the process of claims 7-9 is patentable over Kosho et al. Reconsideration and withdrawal of the rejection is respectfully requested.

Other Prior Art Based Issues

The following Rejections i)-vi) are pending:

- i) Claims 1-3, 7-9 and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Fujita et al., (US 6,720,029) with evidence of inherency provided by Flick (Industrial Solvents Handbook, 5th edition, p. 367);
- ii) Claim 1 and 11 is rejected under 35 U.S.C. 102(e) as being anticipated by Palaniappan et al. (6,630,567);
- iii) Claims 1, 7-8 and 10-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Louwet et al. (7,048,874) with evidence of inherency supplied by Flick (Industrial Solvents Handbook, 5th edition, p. 367);
- iv) Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kosho et al. (JP 2002-151272) as applied to claim 1 above, and further in view of Ito et al. (5,993,694);
- v) Claims 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujita et al., (US 6,720,029) with evidence of inherency provided by Flick (Industrial Solvents Handbook, 5th edition, p. 367) as applied to claims 1-3 above, and further in view of Kosho et al. (JP 2002-151272);
- vi) Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujita et al., (US 6,720,029) with evidence of inherency provided by Flick (Industrial Solvents Handbook, 5th edition, p. 367) as applied to claims 1-3 above, and further in view of Amano et al. (JP 04304465).

Applicants respectfully traverse Rejections i)-vi).

a) Regarding Claim 1

The present inventors have found that a varnish containing an organic charge-transporting substance composed of an oligomer dissolved in a solvent tends to give rise to a film with surface irregularities due to aggregation after application and solvent evaporation, because it has a great intermolecular force due to π - π stacking effect and hence is poorer in dispersibility than polymeric materials having a sufficiently high molecular weight.

The present inventors have *solved the above-problems* by using a charge-transporting oligomer having a number-average molecular weight of 200 to 2,000 as a charge-transporting substance in the varnish. A varnish containing such an oligomer which is dissolved or uniformly dispersed in a high-viscosity solvent with a specific viscosity has a comparatively low flowability and prevents the material and solvent from aggregating due to solvent evaporation at the time of film formation. Thus, the varnish gives rise to a highly uniform thin film that can be used as the hole injection layer of organic EL elements.

This is in distinction to the teachings of Fujita et al. which provides coating liquids containing **polymers** (not oligomers as presently claimed) such as polyaniline Pre-PPV and solvent.

In addition, the present invention is distinct from the teachings of Palaniappan et al., which provides the use of a **polyaniline** (which is a **polymer** and is not an oligomer as presently claimed) solution in a mixture of polyaniline salt and cyclohexanol.

Furthermore, the present invention is distinct from the teachings of Louwet et al. which provides compositions containing PDOT/PSS (which are **polymers** and not oligomers as presently claimed).

In conclusion, none of these references teach or fairly suggest a varnish comprising a charge-transporting oligomer having a number-average molecular weight of 200 to 2,000. This distinction would be significant to the ordinary artisan, since the properties such as solubility or viscosity of polymers are quite different from those of oligomers.

Therefore those skilled in the art would not find that the inventive varnish is anticipated by, or obvious over the teachings of Fujita, Palaniappan or Louwet.

b) Regarding Claim 10

Kosho et al. disclose a varnish containing an oligoaniline.

However, Kosho et al. has not recognized the problems of a varnish containing oligomers.

Therefore, even assuming *arguendo* that Kosho et al. used oligomers in the varnish, the layer formed with the oligomers would be expected to have the problem of surface irregularities.

Therefore those skilled in the art cannot foresee the inventive varnish and the advantageous effect thereof from Kosho, either taken alone or in combination with Ito.

c) Regarding Claims 4 and 6

Fujita et al. disclose that any known material can be used as the charge-transporting polymer material without any particular limitation.

They are silent about the use of oligomers, as presently claimed. The properties such as solubility or viscosity of polymers are quite different from those of oligomers.

Therefore those skilled in the art would not find it obvious to use an oligomer in place of the charge-transporting *polymer* in Fujita.

In addition, the problem addressed by Fujita is to prevent an ink-jet nozzle from clogging. In order to solve the problem, low volatile liquid solvent having a specific vapor pressure and boiling point is used in the coating liquid of Fujita.

The problem to be solved of Fujita is quite different from that of Kosho, as explained above.

From this standpoint, those skilled in the art would not introduce the oligomer of Kosho into the coating liquid of Fujita.

d) Regarding Claim 5

Amano only discloses a monomer having 1,4-dithiine structure.

As explained in section c) above, those skilled in the art would not use an oligomer or monomer in place of the charge-transporting *polymer* of Fujita.

e) Regarding Claim 14

In addition to the argument given in section *a*) above, Fujita, Palaniappan and Louwet are silent about a varnish containing a high viscosity solvent having a viscosity of 50 to 200 mPa•s at 20°C and one or more high-solvency solvent selected from the group consisting of N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone, N-methylformanilide, N,N'-dimethylimidazolidinone, dimethylsulfoxide, chloroform, and toluene.

Accordingly, those skilled in the art cannot foresee the inventive charge-transporting varnish and the effect thereof from the disclosure of the cited references.

Based on the foregoing, significant patentable distinctions exist between the present invention and the teachings of the cited references. As such, reconsideration and withdrawal of the Rejections i)-vi) are respectfully requested.

Double Patenting

The following (provisional) rejections are pending:

(A) Claims 1-3, 5, 7-8, and 11 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-2, 4-6, 12-15 of copending Application No. 10/577,438 in view of Fujita et al. (US 6,720,029); and

(B) Claims 1-4, 6-9, and 11 rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 3-8 of U.S. Patent No. 7,341,678 in view of Fujita et al. (US 6,720,029).

Applicants respectfully traverse the rejections.

The charge-transporting materials of '438 application and '678 patent are *oligomers* in view of the limitation on the maximum number of p, q and r in the '438 application and the limit on the maximum number of m and n in the '678 patent.

Those skilled in the art would not adopt the oligomers of '438 application and '678 patent as a charge-transporting polymer in Fujita, and Fujita does not solve the problem of surface irregularities, as was found and solved by the present inventors. As such, reconsideration and withdrawal of the (provisional) rejections are respectfully requested.

Conclusion

Entry of the above amendments is earnestly solicited. An early and favorable first action on the merits is earnestly solicited.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Gerald M. Murphy, Jr. (Reg. No. 28,977) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

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